Claims

What is claimed is:

1. A system for repairing defects in a semiconductor substrate, comprising:

a scanning probe microscope having a detection tip; and

a defect repair system;

wherein the defect repair system repairs defects in a substrate at location determined by the scanning probe microscope.

2. The system of claim 1, wherein the defect repair system repairs defects using the detection tip of the scanning probe microscope.

3. The system of claim 2, wherein the defects are mechanically removed from the substrate using the detection tip.

4. The system of claim 3, wherein the scanning probe microscope is an atomic force microscope.

5. The method of claim 4, wherein the scanning probe microscope has a diamond tip.

6. The system of claim 2, wherein the defects are repaired by applying a voltage difference between the detection tip and the substrate.

7. The system of claim 6, wherein the voltage difference causes defects to be oxidized away.

8. The system of claim 2, wherein the defects are repaired by heating the detection tip.

9. The system of claim 1, wherein the system locates defects by obtaining both topographical and compositional information concerning the substrate.

10. The system of claim 9, wherein the system creates an electrostatic charge in a portion of the substrate.

11. The system of claim 1, wherein the defect repair system has fixed position relative to the detection tip of the scanning probe microscope.

12. The system of claim 1, wherein the defect repair system receives a defect map generated using the scanning probe microscope.

13. A system for repairing defects in a semiconductor substrate, comprising:

a scanning probe microscope; and

means for selectively processing the semiconductor substrate to repair defects at locations on the semiconductor substrate determined by the scanning probe microscope.

14. A method of repairing a defect in a semiconductor substrate comprising the steps of:

locating the defect using a scanning probe microscope; and

repairing the defect using the location determined by the scanning probe microscope.

15. The method of claim 14, wherein the defect is repaired using a detection tip of the scanning probe microscope.

16. The method of claim 15, wherein the defect is mechanically removed from the substrate using the detection tip.

17. The method of claim 16, wherein the scanning probe microscope is an

atomic force microscope.

18. The method of claim 17, wherein the scanning probe microscope has a diamond tip.

19. The method of claim 16, wherein the defect is removed by forcing the tip against the substrate with a normal force that is at least about ten times greater than the normal force applied to detect the defect.

20. The method of claim 15, wherein the step of repairing the defect comprises applying a voltage difference between the detection tip and the semiconductor substrate.

21. The method of claim 20, wherein the voltage difference causes the defect to be oxidized away.

22. The method of claim 15, wherein the step of repairing the defect comprises heating the detection tip.

23. The method of claim 14 further comprising the step of determining the approximate location of the defect with another instrument prior to the step of determining the defect's location using the scanning probe microscope.

24. The method of claim 14 , wherein the step of locating the defect comprises obtains both topographical and compositional information regarding the substrate.

25. The method of claim 24, wherein the step of locating the defect comprises creating an electrostatic charge in a portion of the substrate.